

Case 3389***Heterocarpus gibbosus* Bate, 1888 (Crustacea, Decapoda, PANDALIDAE):
proposed replacement of the holotype by a neotype**

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Abstract. The purpose of this application, under Article 75.5 of the Code, is to replace the poorly preserved holotype of the deep-sea pandalid prawn *Heterocarpus gibbosus* Bate, 1888, with a recently collected neotype from the type-locality in the Philippines.

Keywords. Nomenclature; taxonomy; *Heterocarpus gibbosus*; holotype; neotype; Philippines; pandalid prawn.

1. *Heterocarpus gibbosus* Bate, 1888 has been widely reported from the Indo-West Pacific (Chace, 1985; Crosnier, 1988) and has some commercial value (Holthuis, 1980; Chan & Yu, 1987; Wadley & Evans, 1991). However, in a recent study of material from the South China Sea and Philippines it became apparent that two 'forms' of *H. gibbosus* could be discerned – one with a well developed exopod on the third maxilliped, the other with the exopod reduced. In addition, the carina on the third abdominal somite has different proportions, and the colour of the thoracic appendages in life are distinct – one with distinct red rings and the other without. The second author has examined extensive material assigned to *H. gibbosus* from other Indo-West Pacific localities such as Taiwan, Fiji and Solomon Islands, and all adult specimens have a well-developed exopod on the third maxilliped. It is clear that the two 'forms' represent different species. Both species occur sympatrically in the Philippines, and the differences are constant for the large series of adults we have examined. Additionally, in fresh and recently preserved material, the species with the shorter exopod has the dorsal margin of the basal rostral teeth and the dactyli of the posterior pereopods coloured deep red. On the other hand, the dorsal margin of the basal rostral teeth and rest of the carapace of the species with the longer exopod are a uniform orangish-red. On the basis of the material we have on hand, there also do not appear to be differences in depth preferences for these two species: the one with a longer exopod was collected between 231 and 888 m, while the one with a short

exopod was obtained from 382 to 888 m. The problem now arises as to which of these two species is the true *Heterocarpus gibbosus*.

2. *Heterocarpus gibbosus* was described by Bate (1888, p. 634) on the basis of a single juvenile specimen (carapace length 16 mm, 'Challenger' Expedition, station 207, off Tables Island, Philippines, 12°21'N 122°15'E, 700 fathoms [1280 m], 16 January 1875). He did not mention the structure of the exopod on the third maxilliped in his description. Only two figures were provided, one being a lateral view of the shrimp and the other a dorsal view of the telson (Bate, 1888, pl. 112, fig. 2), and neither depicted the form of the exopod of the third maxilliped.

3. When Bate (1888) described *H. gibbosus*, he did not indicate that the specimen was in a poor condition. His description was relatively detailed and his figures showed a complete specimen; suggesting that at the time of his study the type specimen was in good condition. However, by the time of Calman's (1939, p. 205) study, the condition of the holotype had deteriorated substantially, forcing him to comment that it '... is not now in a condition to supply any information'. Chace (1985, p. 42), who had a colleague re-examine the type specimen for him, added that it '... lacks all trace of rostrum, eyes, antennae, etc., is largely decalcified and, I strongly suspect, useless for taxonomic purposes'. We examined the holotype (Natural History Museum, London, catalogue number NHM 1888.22) and confirm what Calman (1939) and Chace (1985) had reported. The specimen is badly damaged, soft and decalcified (including the abdomen), almost the entire rostrum is missing and both the diagnostic third maxillipeds are missing (Fig. 1). The specimens from Bate (1888) were all previously preserved in formalin (P.F. Clark, pers. comm.), so the present holotype of *H. gibbosus* cannot be used for DNA analysis, even if this technology might shed some light on its identity. For all intents and purposes, the specimen is of no taxonomic value.

4. Some workers (e.g. de Man, 1920; Chace, 1985; Crosnier, 1988) have commented on the variation observed in the form of the rostral crest of '*H. gibbosus*' while others (Calman, 1939; Chace, 1985) have questioned its relationship and possible synonymy with the closely allied *H. tricarinatus* Alcock & Anderson, 1894, described from the Indian Ocean but since reported in the Pacific. One of the reasons for their doubt was that the holotype of *H. gibbosus* was collected from a depth of 1280 m, far deeper than all recent collections of the species which are from 888 m or less. *Heterocarpus tricarinatus*, on the other hand, has been collected from depths of more than 1046 m (Chace, 1985; Crosnier, 1988) and we have material from the Philippines (Bohol and Sulu Seas, 1756–2307 m depth) and Taiwan (north-eastern coast, 1138–1187 m depth). This was the primary reason why both Calman (1939) and Chace (1985) had wanted to check the holotype of *H. gibbosus* and ascertain if it is the same species as the deeper water *H. tricarinatus*. However, since the holotype specimen is in such poor condition, all they could rely on was Bate's (1888) original description and figures which do not fit well with those of *H. tricarinatus*. As a stop-gap solution, most workers (e.g. Calman, 1939; Chace, 1985; Crosnier, 1988) have provisionally recognised the shallower water species as *H. gibbosus* and the deeper water one as *H. tricarinatus*. Chace's (1985, p. 42) comments on this problem are noteworthy: 'In view of this regrettable development [the holotype being highly deteriorated], there seems to be no reasonable alternative to the retention of the concepts that have been attributed to the names *H. gibbosus* and *H. tricarinatus* in the past'. Our comparisons

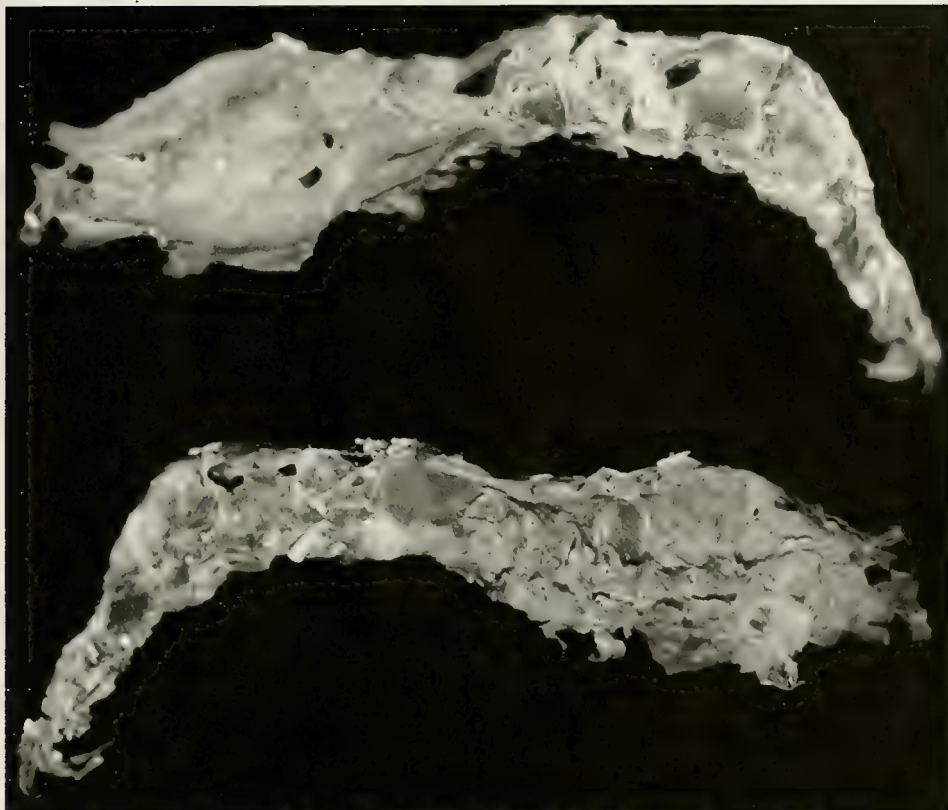


Fig. 1. *Heterocarpus gibbosus* Bate, 1888 – Holotype (NHM 1888.22)

show that there is no doubt that *H. tricarinatus* and '*H. gibbosus*' are different taxa. The most obvious and reliable character is the form of the lateral rostral carinae of *H. tricarinatus* – being sharp over the entire length of the rostrum, whereas in the two species now recognised under '*H. gibbosus*' the carinae are broadly rounded ridges anterior to the eyes. Both Chace (1985) and Crosnier (1988) concur with regard to this character, and the present material confirms this. Both *H. gibbosus* and *H. tricarinatus* occur sympatrically in the Philippines (Chace, 1985; present material), although their depth preferences appear to be different. With the exception of the holotype, all specimens of *H. gibbosus* have been reported from depths ranging from 231 to 888 m (present data; Chace, 1985; Chan & Yu, 1987). Considering the depth from which the holotype of *H. gibbosus* was collected (1280 m), it is also possible that the real *H. gibbosus* is not what is today defined as the species (with the longer third maxilliped exopod) or the new one with the shorter third maxilliped exopod, but represents a completely different taxon which has not been recollected since Bate's (1888) time. This we will never know, even if we ever get such material, as the holotype of *H. gibbosus* is a juvenile and its condition is very poor. Unless this matter can be resolved, it is not possible to establish a stable taxonomy for these prawns.

5. As discussed in para. 1, what is now called *H. gibbosus* is actually a composite of two distinct species, both of which occur sympatrically in the Philippines, with

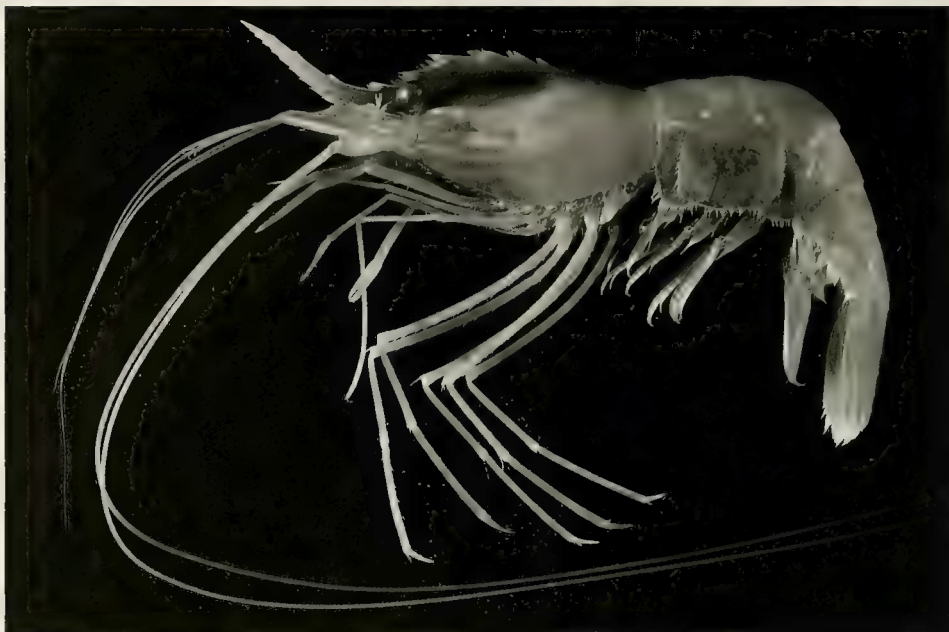


Fig. 2. *Heterocarpus gibbosus* Bate, 1888 – Proposed neotype (NHM 2006.1216)

overlapping depth preferences. Since the holotype of *H. gibbosus* is in such poor condition and lacks all the necessary characters it does not help in resolving which of the two species is the actual species described by Bate (1888). As noted above, *H. gibbosus* Bate, 1888 has no known synonyms, so one of the two species in the Philippines will need to be described as new.

6. The only solution to this taxonomic problem is to replace the holotype with a fresh type specimen which still possesses the key characters needed to objectively resolve the identity of *H. gibbosus* Bate, 1888. To this effect, in accordance with Article 75.5 of the Code, we propose the setting aside of the badly damaged holotype and selection of a neotype to objectively fix the identity of *H. gibbosus* Bate, 1888. The proposed neotype, an ovigerous female (carapace length 30.7 mm, Natural History Museum, London, catalogue number NHM 2006.1216, Bohol Sea, 'Panglao 2005' Expedition, station CA2337, 9°31.5'N, 123°41.7'E, 336 m depth, 22 May 2005) (Fig. 2) is from the same type locality (Philippines), freshly collected, has accompanying colour photographs taken shortly after capture, and provides the opportunity to provide DNA data if the need arises later. It conforms very well with what is today generally recognized as *H. gibbosus*, i.e. the more widely distributed and better understood species with well-developed exopods on the third maxilliped. The other species was described recently as new by the first author (Li, 2006). The present selection of a neotype maintains taxonomic stability while allowing for new work to be done now and in the future.

7. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary power to set aside all type fixations for the nominal species *gibbosus* Bate, 1888, as published in the binomen *Heterocarpus gibbosus*, and to

designate specimen NHM 2006.1216, Bohol Sea, 'Panglao 2005' at the Natural History Museum, London as the neotype;

- (2) to place on the Official List of Specific Names in Zoology the name *gibbosus* Bate, 1888, as published in the binomen *Heterocarpus gibbosus* and as defined by the neotype designated in (1) above.

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References

- Alcock, A. & Anderson, A.R. 1894. Natural history notes from H.M. Indian Marine Survey Steamer *Investigator*, Commander C.F. Oldham, R.N., commanding, Series II, 14: An account of a recent collection of deep sea Crustacea from the Bay of Bengal and Laccadive Sea. *Journal of the Asiatic Society of Bengal*, **63**(2): 141–185.
- Bate, C.S. 1888. Report of the Crustacea Macrura collected by the *Challenger* during the years 1873–1876. *Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873–1876*, vol. 24, part 52. xc, 942 pp., 157 pls. London.
- Calman, W.T. 1939. Crustacea: Caridea. *The John Murray Expedition to the Indian Ocean 1933–1934, Scientific Report*, **6**(4): Pp. 183–224. British Museum (Natural History), London.
- Chace, F.A. Jr. 1985. The Caridean Shrimps (Crustacea: Decapoda) of the *Albatross* Philippine Expedition, 1907–1910, part 3: Families Thalassocarididae and Pandalidae. *Smithsonian Contributions to Zoology*, **411**: 1–143.
- Chan, T.-Y. & Yu, H.-P. 1987. On the *Heterocarpus* shrimps (Crustacea: Decapoda: Pandalidae) from Taiwan. *Bulletin of the Institute of Zoology, Academia Sinica*, **26**(1): 53–60.
- Crosnier, A. 1988. Sur les *Heterocarpus* (Crustacea, Decapoda, Pandalidae) du sud-ouest de l'océan Indien. Remarques sur d'autres espèces ouest-pacifiques du genre et description de quatre taxa nouveaux. *Bulletin du Muséum national d'Histoire Naturelle, Paris*, (4)**10**: 57–103.
- Holthuis, L.B. 1980. Shrimps and prawns of the world: an annotated catalogue of species of interest to fisheries. *FAO Fisheries Synopsis*, vol. 125(1). xvii, 271 pp. [Volume 1 of FAO Species Catalogue].
- Li, X. 2006. Additional pandaloid shrimps from the South China Sea (Crustacea: Decapoda: Caridea), with description of one new species. *The Raffles Bulletin of Zoology, Singapore*, **54**(2): 361–372, figs. 1–7.
- Man, J.G. de. 1920. The Decapoda of the Siboga Expedition, IV: Families Pasiphaeidae, Stylodactylidae, Hoplophoridae, Nematocarinidae, Thalassocaridae, Pandalidae, Psalidopodidae, Gnathophyllidae, Processidae, Glyphocrangonidae and Crangonidae. *Siboga-Expeditie*, vol. 39a3, livr. 87. 318 pp., 25 pls.
- Wadley, V. & Evans, D. 1991. *Crustaceans from the deepwater trawl fisheries of Western Australia*. 44 pp. CSIRO Division of Fisheries, Hobart, Australia.

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